RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole # 41-08-07

Log Event A

Borehole Information

Farm : SX **Tank :** SX-108 **Site Number :** 299-W23-100
N-Coord : 35,318 **W-Coord :** 75,804 **TOC Elevation :** 662.22
Water Level, ft : **Date Drilled :** 03/16/1962

Casing Record

Type : Steel-welded **Thickness :** 0.280 **ID, in. :** 6
Top Depth, ft. : 0 **Bottom Depth, ft. :** 75

Equipment Information

Logging System : 1 **Detector Type :** HPGe **Detector Efficiency:** 35.0 %
Calibration Date : 03/1995 **Calibration Reference :** GJPO-HAN-1

Logging Information

Log Run Number : 1 **Log Run Date :** 6/12/1995 **Logging Engineer:** Bob Spatz
Start Depth, ft.: 0.0 **Counting Time, sec.:** 100 **L/R :** L **Shield :** N
Finish Depth, ft. : 10.5 **MSA Interval, ft. :** 0.5 **Log Speed, ft/min.:** n/a

Log Run Number : 2 **Log Run Date :** 6/12/1995 **Logging Engineer:** Bob Spatz
Start Depth, ft.: 9.5 **Counting Time, sec.:** 100 **L/R :** L **Shield :** N
Finish Depth, ft. : 60.0 **MSA Interval, ft. :** 0.5 **Log Speed, ft/min.:** n/a

Log Run Number : 3 **Log Run Date :** 6/13/1995 **Logging Engineer:** Bob Spatz
Start Depth, ft.: 60.5 **Counting Time, sec.:** 100 **L/R :** R **Shield :** N
Finish Depth, ft. : 62.0 **MSA Interval, ft. :** 0.5 **Log Speed, ft/min.:** n/a

Log Run Number : 4 **Log Run Date :** 6/13/1995 **Logging Engineer:** Bob Spatz
Start Depth, ft.: 73.5 **Counting Time, sec.:** 100 **L/R :** L **Shield :** N
Finish Depth, ft. : 73.5 **MSA Interval, ft. :** 0.5 **Log Speed, ft/min.:** n/a

Analysis Information

Analyst : P.D. Henwood
Data Processing Reference : Data Analysis Manual Ver. 1 Analysis Date : 8/11/1995

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Analysis Notes :

This borehole was logged in four runs. The pre- and post-survey field verification spectra showed consistent activities, indicating the logging system operated properly during the logging event. Energy calibrations differed because of gain drift in the instrumentation. Gain drifts during data collection necessitated multiple energy versus channel number recalibrations during processing of the data to maintain proper peak identification. A depth overlap occurred from 9.9 to 10.5 ft where the data repeatability was good. A casing correction factor for a casing thickness of 1/4 (0.25) inches was applied to the log data. No other corrections, such as for water, were made to the log data.

No data were collected from 62.5 to 73.5 ft, where the detector saturated because of a high count rate. Cs-137 was measured at 1,000 pCi/g, and the total gamma count rate was measured at 373,000 counts per second at 62 ft, just before the depth where detector saturation occurred. A measurement at the bottom of the borehole at 73.5 ft (run 4) could not be collected because of the detector saturation. The U-238 (609 keV) energy peak could not be quantified after about 30 ft because of the influence of the Cs-137 (661 keV) energy peak. Therefore, the 1764 keV gamma ray was used to calculate U-238 concentrations.

Spectra collected from just above the zone of detector saturation indicated elevated counts in the low-energy continuum. The elevated continuum could be caused by bremsstrahlung radiation, which is the result of a high-energy beta emitter such as Sr-90. The concentrations above 62 ft are also characteristic of a point source where detection of gamma rays decreases inversely as the square of the distance away from the source. Additional information and interpretations of log data for this borehole are included in the main body of the Tank Summary Data Report for tank SX-108.

Log Plot Notes:

Three log plots are provided. The Cs-137 concentrations are provided in a separate log plot to document the relative concentrations and shape of the distribution. A plot of naturally occurring radionuclides (K-40, U-238, and Th-232) is also provided, which can be used for lithology interpretation. A combination plot includes logs of Cs-137, natural gamma, total gamma derived from the spectral data, and the latest available data from the WHC Tank Farms gross gamma logging. The energy peaks from which the radionuclide concentrations were derived are included in the headings for the Cs-137 and natural gamma plots.

Log scales were selected for Cs-137, total gamma, and gross gamma logs in order to emphasize the maximum peak intensities. The natural gamma logs are plotted on a linear scale.

The statistical uncertainty in a measurement is represented by uncertainty bars on the log plots where appropriate. This uncertainty is reported at the 95-percent confidence interval. The minimum detectable activity (MDA) is represented as an open circle on the plots. The MDA of a radionuclide represents the lowest concentraton at which positive identification of a gamma-ray peak is statistically defensible. If the reported concentration is slightly above the MDA, the 95-percent confidence interval may extend below the MDA value and detection is not assured with 95-percent certainty.

The Tank Farms gross gamma plot is the latest available from WHC.